

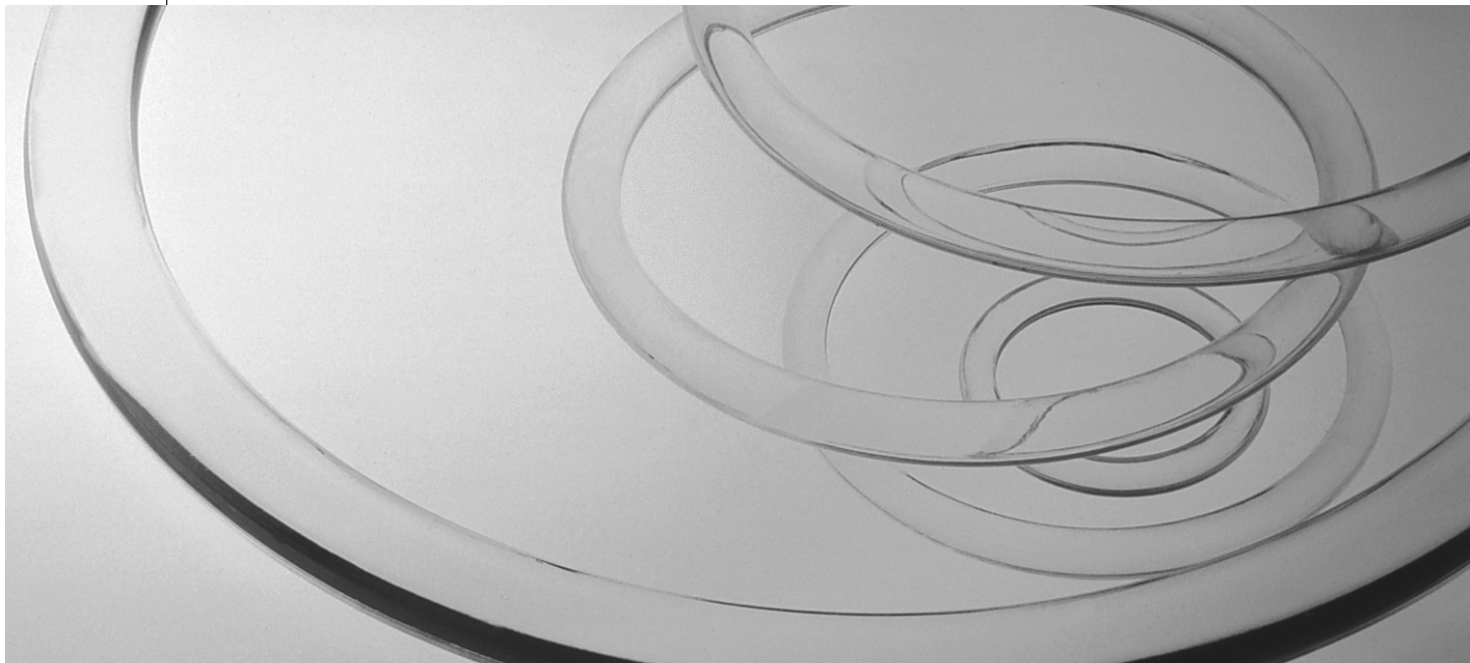


3COM

OfficeConnect®

Ethernet Hub 16C (3C16702A)

User Guide



3Com Corporation ■ 5400 Bayfront Plaza ■ Santa Clara, California ■ 95052-8145

Copyright © 2002, 3Com Technologies. All rights reserved.

No part of this documentation may be reproduced in any form or by any means or used to make any derivative work (such as translation, transformation, or adaptation) without written permission from 3Com Technologies.

3Com Technologies reserves the right to revise this documentation and to make changes in content from time to time without obligation on the part of 3Com Technologies to provide notification of such revision or change.

3Com Technologies provides this documentation without warranty, term, or condition of any kind, either implied or expressed, including, but not limited to, the implied warranties, terms or conditions of merchantability, satisfactory quality, and fitness for a particular purpose. 3Com may make improvements or changes in the product(s) and/or the program(s) described in this documentation at any time.

If there is any software on removable media described in this documentation, it is furnished under a license agreement included with the product as a separate document, in the hard copy documentation, or on the removable media in a directory file named LICENSE.TXT or !LICENSE.TXT. If you are unable to locate a copy, please contact 3Com and a copy will be provided to you.

UNITED STATES GOVERNMENT LEGEND

If you are a United States government agency, then this documentation and the software described herein are provided to you subject to the following:

All technical data and computer software are commercial in nature and developed solely at private expense. Software is delivered as "Commercial Computer Software" as defined in DFARS 252.227-7014 (June 1995) or as a "commercial item" as defined in FAR 2.101(a) and as such is provided with only such rights as are provided in 3Com's standard commercial license for the Software. Technical data is provided with limited rights only as provided in DFAR 252.227-7015 (Nov 1995) or FAR 52.227-14 (June 1987), whichever is applicable. You agree not to remove or deface any portion of any legend provided on any licensed program or documentation contained in, or delivered to you in conjunction with, this User Guide.

Unless otherwise indicated, 3Com registered trademarks are registered in the United States and may or may not be registered in other countries.

3Com and OfficeConnect are registered trademarks of 3Com Corporation. The 3Com logo is a trademark of 3Com Corporation

Microsoft, MS-DOS, Windows, and Windows NT are registered trademarks of Microsoft Corporation. Novell and NetWare are registered trademarks of Novell, Inc.

All other company and product names may be trademarks of the respective companies with which they are associated.

Please e-mail any comments about this document to 3Com at: **pddtechpubs_comments@3Com.com**. Please include the document title (OfficeConnect Ethernet Hub 16C), part number (DUA1670-2AAA04) and, if appropriate, the page number.

Introduction 5

Creating Your Network 6

Ethernet Hub 16C—Front 6

Ethernet Hub 16C—Rear 7

Before You Start 8

Product Registration 8

Workstation Connections 8

Hub Connections 8

Stacking the Units together 9

The Rubber Feet 9

The Stacking Clip 9

Positioning Your OfficeConnect Hub 10

Securing the OfficeConnect Hub 10

Connecting Workstations and Other Equipment to Your Hub 11

Connecting OfficeConnect Hubs Together 11

Connecting Hubs Using 10BASE-2 (Coaxial) 12

Connecting Hubs Using 10BASE-T 13

Checking Hub Connections 13

Spot Checks 13

Problem Solving 14

Networking Terminology 16

Dimensions and Standards 17

Dimensions and Operating Conditions 17

Standards 17

Environmental Statements 18

End Of Life Statement 18

Regulated Materials Statement 18

Environmental Statement about the Documentation 18

Environmental Statement about the Product Packaging 18

Regulatory Notices 19

INTRODUCTION

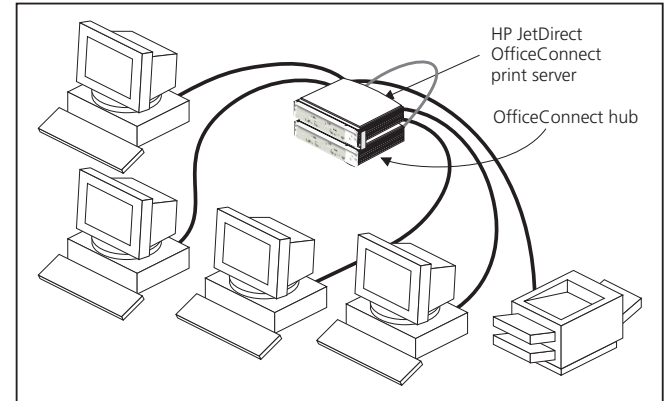
Welcome to the world of networking with 3Com®. In the modern business environment, communication and sharing information is crucial. Computer networks have proved to be one of the fastest modes of communication but, until recently, only large businesses could afford the networking advantage. The OfficeConnect® product range from 3Com has changed this, bringing networks to the small office.

The OfficeConnect Ethernet Hub 16C is ideal for creating small networks. It is compact and attractively designed for desktop use. This product forms part of the OfficeConnect range which neatly stack together with the OfficeConnect stacking clip.

When referring to the OfficeConnect Ethernet Hub 16C, this guide uses the term 'OfficeConnect hub'.

A single OfficeConnect hub allows you to create a small network with up to sixteen workstations, as shown in Figure 1.

Figure 1 Small Network With OfficeConnect Hub And Optional Print Server



If you need to connect more workstations, simply use the stacking clip to connect another OfficeConnect hub to form a stack (each hub is a single repeater).

The OfficeConnect Ethernet Hub 16C has sixteen 10BASE-T ports and one 10BASE-2 (Coaxial) connector.

CREATING YOUR NETWORK

Ethernet Hub 16C—Front

► Alert LED

orange

Alerts you to excessive network use or an isolated (partitioned) 10BASE-T port.

► Power LED

green

Indicates that the power supply to the hub is present.

► Collision LED

yellow

Flashes each time a collision is detected on the network. Collisions are part of normal network operation.

► Port Status LEDs

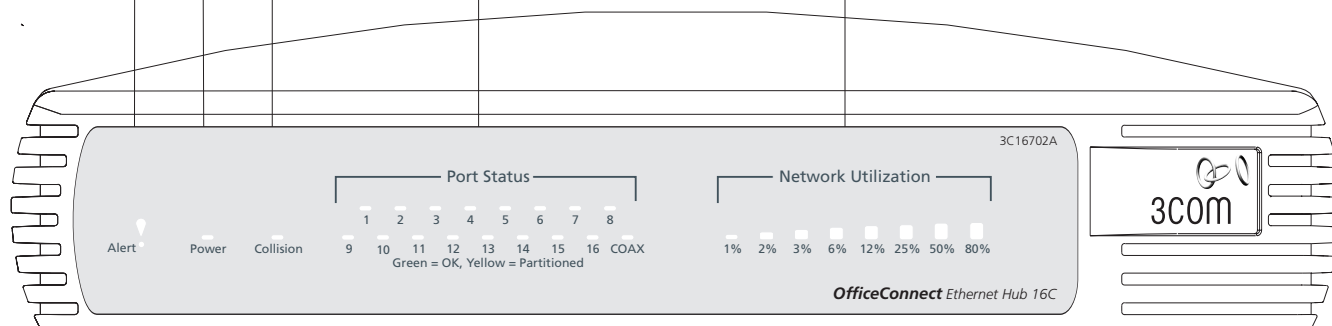
green/yellow

Indicates the status of each port. If the LED is green, the link between the port and the next piece of network equipment is OK. If nothing is connected, the LED is off. If yellow, the port has partitioned due to a fault on that segment. The Coaxial port LED can only be yellow

► Network Utilization LEDs

green/yellow/orange

Indicates how much your network is being used.



Ethernet Hub 16C—Rear

► Power Adapter socket

Only use the power adapter that is supplied with this OfficeConnect hub. Do not use any other adapter.

► Coaxial port

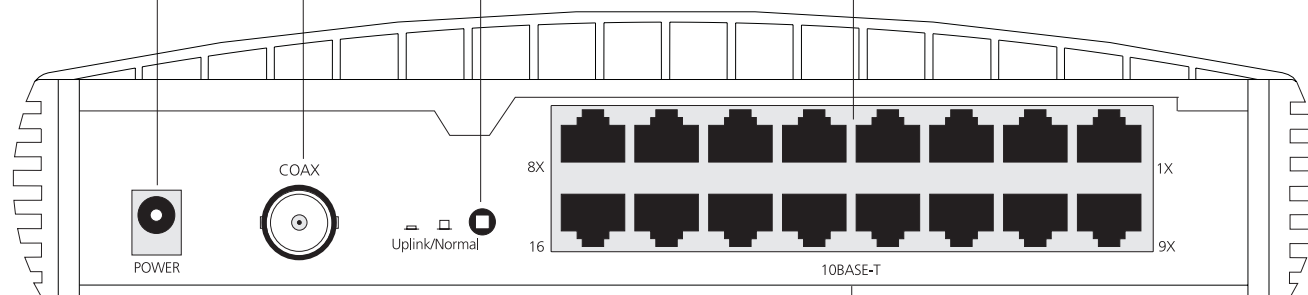
Can be used to connect your hub to other OfficeConnect hubs and equipment with 10BASE-2 (Coaxial) cabling.

► Uplink/Normal switch

Affects the operation of port 16. If you are connecting a hub to the port, set to Uplink (in), otherwise set to Normal (out). See the “Connecting OfficeConnect Hubs Together” section.

► Sixteen 10BASE-T RJ-45 ports

Use suitable TP cable with RJ-45 connectors. You can connect the OfficeConnect hub to any workstation or OfficeConnect hub that has a 10BASE-T port. See the “Connecting OfficeConnect Hubs Together” section.



► **WARNING: RJ-45 ports.**

These are shielded RJ-45 data sockets. They cannot be used as telephone sockets. Only connect RJ-45 data connectors to these sockets.

WARNHINWEIS: RJ-45-Anschlüsse

Dies sind abgeschirmte RJ-45-Datenbuchsen. Sie können nicht als Telefonanschlußbuchsen verwendet werden. An diesen Buchsen dürfen nur RJ-45-Datenstecker

AVERTISSEMENT: Ports RJ-45.

Il s'agit de prises femelles blindées de données RJ-45. Vous ne pouvez pas les utiliser comme prise de téléphone. Branchez uniquement des connecteurs de données RJ-45

Before You Start

Your OfficeConnect hub comes with:

- One power adapter for use with the OfficeConnect hub.
- Four rubber feet.
- A stacking clip.
- One Support and Safety Information Sheet
- One Warranty Flyer



The extra parts mentioned in the next section are not supplied with the hub.

Product Registration

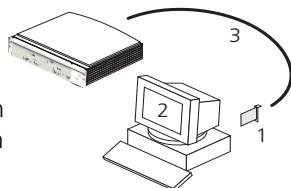
You can now register your OfficeConnect hub on the 3Com web site and receive up-to-date information on your product.

<http://support.3com.com/registration/frontpg.pl>

Workstation Connections

To connect workstations or other equipment to your hub, you need:

- 1 10BASE-T connections for all your equipment. 3Com produce a range of easy to install network adapters, which provide your workstations with 10BASE-T connections.



- 2 An operating system (for example, Netware or Windows 95/98) with network support configured, running on your workstations.
- 3 One 'Straight-through' 10BASE-T cable for every workstation or piece of equipment. A 'Straight-through' cable is one where the pins of one connector are connected to the same pins of the other connector. 10BASE-T cables can be shielded or unshielded. We recommend you use shielded. The maximum length you can use is 100m (328ft).



In order to comply with the 10BASE-T standard, ports designed for workstation connections have been marked with the graphical symbol 'x'. This denotes a crossover in the port's internal wiring, for example 1x, 2x, 3x...

Hub Connections

If you have additional hubs you want to connect using 10BASE-2 (Coaxial), you need:

- One 10BASE-2 50 Ohm cable for each additional hub. The minimum cable length you can use is 0.5m (1.6 ft). The maximum segment length you can have is 185m (607ft).
- One 10BASE-2 'Y' piece for each hub. You can use 'T' pieces but 'Y' pieces provide optimum clearance of the other ports.
- Two 10BASE-2 50 Ohm terminators (end pieces).

If you want to connect additional hubs using 10BASE-T, you need:

- One 'Straight-through' 10BASE-T cable for each additional hub.

Stacking the Units together

The Rubber Feet

The four self-adhesive rubber feet prevent your hub from moving around on your desk. Stick the feet to the marked areas at each corner of the underside of your hub. Do not fix the feet if you are going to use the clip.

The Stacking Clip

The stacking clip allows you to stack your OfficeConnect units together neatly and securely.



CAUTION: You can stack up to a maximum of four units. Smaller units must be stacked on top.

To fit the clip:

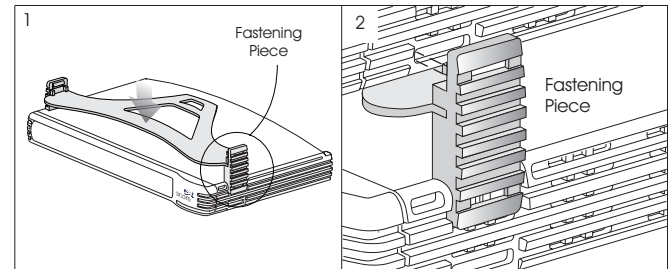
- 1 Place your unit on a flat surface.
- 2 Fit the clip across the top of the unit, as shown in Figure 2 (picture 1), ensuring that the longer sections of the fastening pieces are pointing downwards.
- 3 Align the fastening pieces over the slots found on each side of the unit.

- 4 Push the clip down gently to secure it, ensuring the fastening pieces snap into the slots on the unit.

To fit another unit:

- 1 Rest the second unit on top of the clip and align it with the front of the unit below.
- 2 Press down gently on the unit to secure it onto the clip, ensuring the fastening pieces fit into the slots on the unit below, as shown in Figure 2 (picture 2).

Figure 2 Stacking Your Units Together



To remove the clip:

- 1 Remove the top unit together with the clip. If you hook a finger around one of the fastening pieces and then pull it gently from out of the slot, the clip should come away with the upper unit attached to it.
- 2 Push the clip in the center, so it bends towards the base of the unit, and then separate once the clip is loose.

Positioning Your OfficeConnect Hub

When installing your OfficeConnect hub, ensure:

- It is out of direct sunlight and away from sources of heat.
- Cabling is away from power lines, fluorescent lighting fixtures, and sources of electrical noise such as radios, transmitters and broadband amplifiers.
- Water or moisture cannot enter the case of the unit.
- Air flow around the unit and through the vents in the side of the case is not restricted. We recommend you provide a minimum of 25.4 mm (1in.) clearance.

Securing the OfficeConnect Hub

There are two slots on the underside of the OfficeConnect hub which can be used for wall mounting. It is recommended that you mount the hubs with the LEDs facing upwards to prevent dust entering the cooling vents.



When wall mounting the unit, ensure that it is within reach of the power outlet.

You need two suitable screws. Ensure that the wall you are going to use is smooth, flat, dry and sturdy. Make two screw holes which are 142mm (5.6in.) apart. Use the guide at the back of this manual to mark the position of the holes. Fix the screws into the wall, leaving their heads 3mm (0.12in.) clear of the wall surface.

Remove any connections to the unit and locate it over the screw heads. When in line, gently push the unit on to the wall and move it downwards to secure. When making connections, be careful not to push the unit up and off the wall.



CAUTION: *Only wall mount single units, do not wall mount stacked units.*

Also available from 3Com, is the OfficeConnect Mounting Unit (part number 3C16765). This allows you to firmly secure a stack of OfficeConnect devices to the desktop or onto a shelf in a rack.

Connecting Workstations and Other Equipment to Your Hub



WARNING: Please read the 'Important Safety Information' sheet before you start.



WARNHINWEIS: Bitte lesen Sie den Abschnitt 'Wichtige Sicherheitsinformationen' sorgfältig durch, bevor Sie das Gerät einschalten.



AVERTISSEMENT: Veuillez lire attentivement la section "Consignes importantes de sécurité" avant de mettre en route.



CAUTION: Do not power the hub off and on quickly. Wait about five seconds between power cycles.

Connecting workstations and other equipment to your hub is easy. Connect them using 10BASE-T cables to any of the hub's sixteen 10BASE-T RJ-45 ports.

10BASE-T cables are very easy to use. To connect a 10BASE-T cable, simply slot the connector into the relevant RJ-45 port. When the connector is fully in, its latch locks it into place. To disconnect the cable, push the connector's latch in and remove it.

The hub detects all port connections, so you can start using your network immediately. When you need more ports, simply add more OfficeConnect hubs.



If you are using port 16 to connect to a workstation, ensure the Uplink/Normal switch is set to Normal (out).

Connecting OfficeConnect Hubs Together

You can increase the number of workstations that can connect to your network by adding more OfficeConnect hubs. You can use either 10BASE-T or 10BASE-2 (Coaxial) to do this:

- With 10BASE-2 (Coaxial) you can connect up to 30 hubs on a single segment, leaving all of the RJ-45 ports free.
- With 10BASE-T you can connect up to four hubs in series.



CAUTION: Do not connect the same two hubs together using both 10BASE-T and 10BASE-2 (Coaxial). This causes a network loop.

Connecting Hubs Using 10BASE-2 (Coaxial)

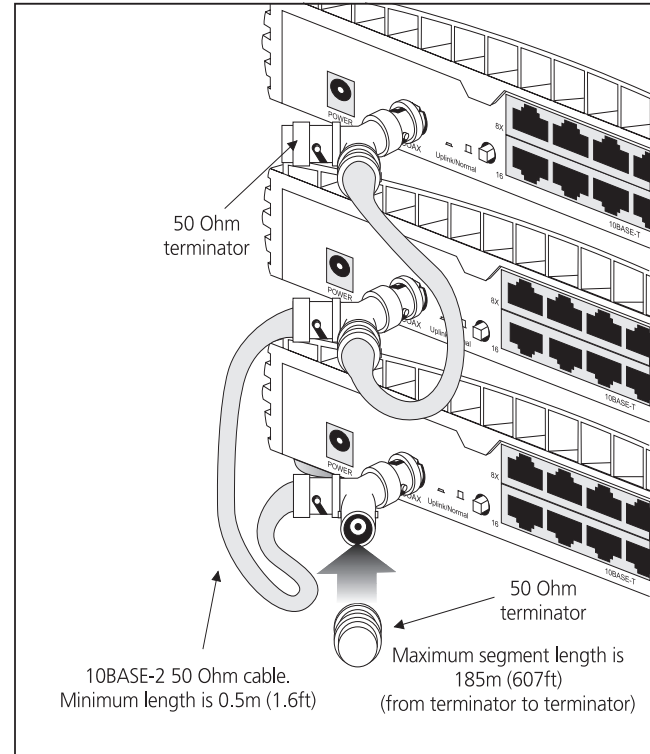
i When using 10BASE-2 (Coaxial) cable, it is important that both ends of the segment are properly terminated with 50 Ohm terminators (end pieces).

i Only use 50 Ohm 10BASE-2 (Coaxial) cables and use a 'Y' piece for each hub. You can use 'T' pieces but 'Y' pieces provide optimum clearance of the other ports.

Connect a 10BASE-2 'Y' piece to each of your hubs. Daisy-chain each 'Y' piece with 10BASE-2 (Coaxial) cable to form a single segment (as shown in Figure 3). Remember to terminate the two free ends of the segment by fitting terminators (end pieces).

To disconnect a 10BASE-2 (Coaxial) cable, twist each connector counter-clockwise to unlock it, and remove it.

Figure 3 Correct Hub Connections Using 10BASE-2 (Coaxial)



Connecting Hubs Using 10BASE-T

You can connect hubs together with 10BASE-T in a number of ways, but for simplicity we recommend the following method:

- 1 Starting from the bottom, connect port 16 of the lower hub to port 15 of the hub immediately above. Repeat for each hub (as shown in Figure 4).
- 2 Set all Uplink/Normal switches to Uplink (in) except for the top hub (the one with port 16 not connected to another hub). This unused port can be connected to a workstation provided that the Uplink/Normal switch is set to Normal (out).

Checking Hub Connections

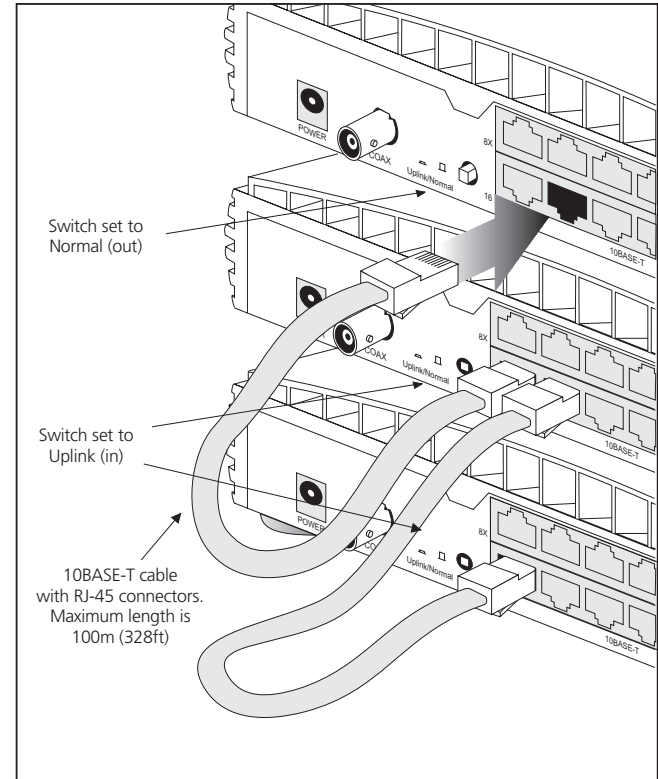
When you have connected your hubs, power them on. The Port Status LEDs for the ports you have used on the hubs should be green. If they are not, check your connections and the settings of the Uplink/Normal switches.

Spot Checks

At frequent intervals, visually check that:

- The Alert LED is off — this is the best way to find out if there are problems with your network.
- Case vents are not obstructed.
- Cabling is secure and not pulled taut.

Figure 4 Correct Hub Connections Using 10BASE-T



PROBLEM SOLVING

The OfficeConnect hub has been designed to aid you when detecting and solving possible problems with your network. These problems are rarely serious; the cause is usually a disconnected or damaged cable, or incorrect configuration. If this section does not solve your problem, contact your supplier for information on what to do next.

Perform these actions first:

- Ensure all equipment is powered on.
- Power each unit off, wait about 5 seconds and then power them on.

Check the following symptoms and solutions:

Power LED not lit. Check your power adapter connection. If there is still no power, you may have a faulty power adapter which needs replacing with another OfficeConnect power adapter. **Do not use any other power adapter with the hub.**

Port Status LED yellow for a 10BASE-T port. It is likely that there is a loop in your network which has caused this port to partition. Examine your connections and remove the loop. Each piece of equipment needs only one connection to your OfficeConnect hub. The LED will change from yellow to green, on receiving a valid packet on the port.

Link between two OfficeConnect hubs not working.

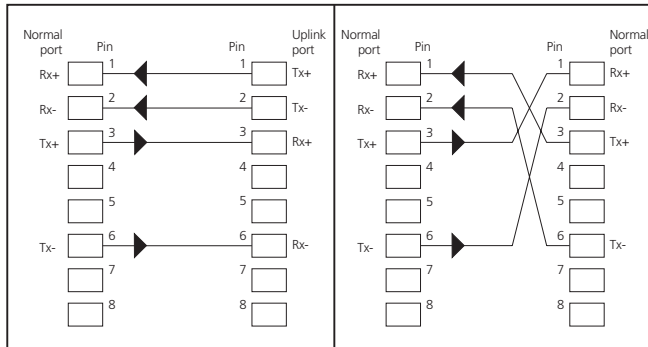
Check your hub connections; follow the information given in the “Connecting OfficeConnect Hubs Together” on page 11. With 10BASE-T it is likely that an Uplink/Normal switch is incorrectly set. With 10BASE-2 (Coaxial) it is likely a terminator (end piece) is not properly fitted; this would cause the Coaxial Port Status LED to light yellow (partition).

Alert LED continuously lit. There is either continual excessive use of your network (over 80%) or, more likely, a 10BASE-T port has partitioned due to a loop in your network (in which case the corresponding Port Status LED will be yellow). Examine your connections and remove the loop. Each piece of equipment needs only one connection to your OfficeConnect hub.

Port Status LED not lit for a port that has a connection. There is a problem with this connection. Check that you are using a ‘Straight-through’ cable which is properly connected at both ends, and is not damaged. If the cable is connected to port 16, ensure that the Uplink/Normal switch is set to Normal (out). Also check that the equipment being connected to the hub is powered on, operating correctly and contains the correct type of connection.

Refer to Figure 5 below to compare the wiring of a straight-through and a crossover cable.

Figure 5 Straight-through Cable/Crossover Cable



NETWORKING TERMINOLOGY

A **Network** is a collection of workstations (for example, IBM-compatible PCs) and other equipment (for example, printers), connected for the purpose of exchanging information or sharing resources. Networks vary in size, some are within a single room, others span continents.

A **Local Area Network (LAN)** is a network, usually in an office, that spans no more than a single site.

Ethernet is a type of LAN, referring to the technology used to pass information around the network. It operates at 10Mbps (megabits per second).

10BASE-T is the name given to the Ethernet protocol that runs over **Twisted Pair (TP)** cable at 10Mbps. The OfficeConnect hub uses RJ-45 type connectors for connecting your TP network

10BASE-2 is the name given to the Ethernet protocol that runs over **Coaxial** cable.

A **Network Loop** occurs when two pieces of network equipment are connected by more than one path. Your hub detects this and **partitions** (isolates) one of its ports to break the loop.

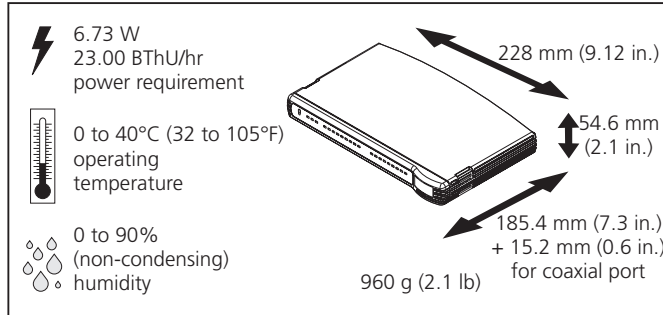
A **segment** is the length of cable connected to a port, whether this cable is 10BASE-T, 10BASE-2 (Coaxial), or another type. When you daisy-chain equipment together with 10BASE-2 (Coaxial) cable, via single speed hubs, the entire cable forms a single segment.

Packets are the units of information your workstations and other equipment send to each other over the network.

Collisions are a part of normal Ethernet operation and occur if two or more devices (pieces of network equipment) attempt to transmit at the same time. A sudden sustained increase in the number of collisions can indicate a problem with a device, particularly if it is not accompanied by a general increase in traffic. On coaxial segments an increase in collisions can also indicate faulty cabling.

DIMENSIONS AND STANDARDS

Dimensions and Operating Conditions



Standards

Functional: ISO 8802/3
IEEE 802.3

Safety: UL 1950
EN 60950
CSA 22.2 #950
IEC 60950

EMC: EN 55022 Class B[†]
EN 55024
FCC Part 15 Class B^{†*}
ICES-003 Class B
VCCI Class B[†]
CNS 13438 Class A

Environmental: EN 60068 (IEC 68) Various parts

[†]Category 3 or 5 screened or unscreened cables can be used to comply with the Class B requirements.

*Refer to "Regulatory Notices" on page 19 for conditions of operation.

ENVIRONMENTAL STATEMENTS

It is the policy of 3Com Corporation to be environmentally-friendly in all operations. To uphold our policy, we are committed to:

- Establishing environmental performance standards that comply with national legislation and regulations.
- Conserving energy, materials and natural resources in all operations.
- Reducing the waste generated by all operations.
- Ensuring that all waste conforms to recognized environmental standards.
- Maximizing the recyclable and reusable content of all products.
- Ensuring that all products can be recycled, reused and disposed of safely.
- Ensuring that all products are labelled according to recognized environmental standards.
- Improving our environmental record on a continual basis.

End Of Life Statement

3Com processes allow for the recovery, reclamation and safe disposal of all end-of-life electronic components.

Regulated Materials Statement

3Com products do not contain any hazardous or ozone-depleting material.

Environmental Statement about the Documentation

The documentation for this product is printed on paper that comes from sustainable, managed forests; it is fully biodegradable and recyclable, and is completely chlorine-free. The varnish is environmentally-friendly, and the inks are vegetable-based with a low heavy-metal content.

Environmental Statement about the Product Packaging

The packaging for this product is fully recyclable. It has a recycled (post consumer) waste content of at least 40% by weight, and no heavy-metal content.

REGULATORY NOTICES

FCC STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules, and the Canadian Department of Communications Equipment Standards entitled, "Digital Apparatus," ICES-003. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment causes interference to radio or television reception, which can be determined by turning the equipment off and on, try to correct the interference by using one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the equipment with respect to the receiver.
- Move the equipment away from the receiver.
- Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.
- Consult the dealer or an experienced radio/television technician for help.

CSA STATEMENT

This Class B digital apparatus meets all requirements of the Canadian interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

CE STATEMENT (EUROPE)

This product complies with the European Low Voltage Directive 73/23/EEC and EMC Directive 89/336/EEC as amended by European Directive 93/68/EEC.

VCCI STATEMENT

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス B 情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

BSMI STATEMENT

警告使用者：這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

INFORMATION TO THE USER

The user may find the following booklet prepared by the Federal Communications Commission helpful:

How to Identify and Resolve Radio-TV Interference Problems

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

In order to meet FCC emissions limits, this equipment must be used only with cables which comply with IEEE 802.3.



Wall mounting screw hole guide
142mm (5.6in.)



